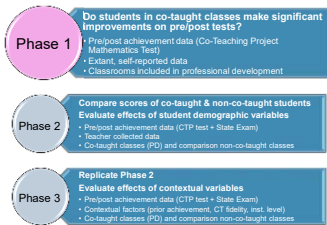


Kristen R. Rolf, M.Ed., and Kaitlin Bundock, Ph.D., Utah State University

INTRODUCTION

Background:

Co-teaching: "two or more professionals delivering substantive instruction to a diverse, or blended, group of students in a single physical space" (Cook & Friend, 1995, p. 2)



Research questions – Phase 1:

- 1) What are the characteristics of a state-led professional development model for co-teaching mathematics in secondary schools?
- 2) Do students with disabilities in participating co-taught classes improve their scores on a pre/post mathematics test?
- 3) Do students without disabilities in participating co-taught classes improve their scores on a pre/post mathematics test?

PRIOR RESEARCH

Article	PD Provider	PD Structure	Content and Grades	Outcomes
Indriano, Birmingham, Garrick & Maresco, 1999	University personnel	Collaborative, 2-week institutes	First grade reading	Increased opportunities for teachers & students, decreased stigma
Pearl, Dieker, & Kirkpatrick, 2012	University personnel	One day in-service, one day workshop, Five 1-hr webinars, two ½ day coaching	Elementary, Middle, & High Literacy & Math	Gap in GPA narrowed, increased number of components evident
Walsh, 2012	District level SPED and curricular personnel	Off-site PD 4 days p/yr, coaching	Grades 3-8, reading & math	Increase in % of students with disabilities proficient on state exam, gap narrowing
Wischnowski et al., 2004	University personnel	In-service trainings	Elementary & Middle, all subjects	Acceptable grades, positive feedback from stakeholders

SCHOOL DISTRICTS

	A (7-1, 7-2)	B (7-3, 8)	C (7-4, 7-5, 8-1, 8-2)	D (Sec. 1)
Total Enrollment	4,889	31,317	29,187	34,423
ELL	8.89%	2.96%	6.14%	5.28%
IEP	6.91%	13.18%	13.87%	10.78%
Free/Reduced	21.56%	33.97%	42.34%	30.03%
White	75.72%	82.33%	80.50%	74.65%
Hispanic	19.76%	12.14%	12.83%	15.66%
Black	0.51%	0.85%	0.85%	13.30%
Am. Indian/AK Native	<0.01%	0.46%	1.80%	0.42%
Asian/Pacific Isl.	1.82%	0.94%	0.76%	2.26%
Hawaiian/Pacific Isl.	<0.01%	0.80%	1.74%	1.14%
Other or 2+	1.84%	2.68%	1.52%	4.55%

PROFESSIONAL DEVELOPMENT

Pedagogy	Mathematics
Common disability categories	Standards for Mathematical Practice
Fostering a co-teaching relationship	Concepts and Skills
Co-teaching model/stances	• Fractions
Growth mindset	• Ratios & proportions
Reflective practice (Marzano)	• Solving equations
5 anchors and SDI across tiers	• Graphing
Universal Design for Learning	

Training:

- 10 days throughout school year
- Reflective, non-evaluative observations conducted by coach three times/year

Products:

- Action research project using target student data
- Small groups lead discussion of chapters from *Mathematical Mindsets* (Boaler, 2016)

RESULTS

Table 1
T-Test Results for Pre and Post Co-Teaching Project Mathematics Test- Students Without IEPs

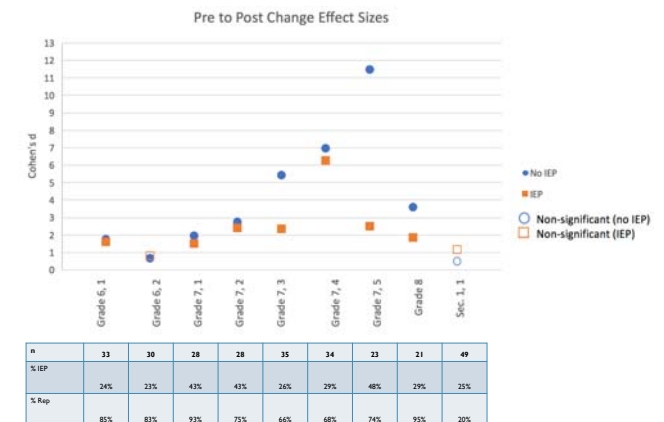
School	Class	t	df	p	95% CI	LL	UL	Cohen's d
A	7.1	7.51	14	0.00*	17.91	9.95	1.93	
	7.2	10.27	13	0.00*	15.90	10.37	2.74	
B	7.3	21.74	15	0.00*	34.03	27.96	5.43	
	8	13.89	14	0.00*	58.48	42.84	3.58	
C	6.1	7.96	20	0.00*	9.37	5.48	1.73	
	6.2	3.01	19	0.01*	5.67	1.02	0.67	
	7.4	26.95	14	0.00*	38.57	32.89	6.96	
	7.5	34.36	8	0.00*	76.83	67.16	11.45	
D	Sec. 1	1.165	6	0.29	22.14	7.85	0.44	

Note. IEP = Individualized Education Program; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; *p < .05.

Table 2
T-Test Results for Pre and Post Co-Teaching Project Mathematics Test- Students With IEPs

School	Class	t	df	p	95% CI	LL	UL	Cohen's d
A	7.1	4.87	10	0.001*	17.48	6.51	1.47	
	7.2	6.35	6	0.001*	13.85	6.14	2.40	
B	7.3	6.23	6	0.001*	41.18	17.96	2.35	
	8	4.13	4	0.014*	53.15	10.44	1.84	
C	6.1	4.26	6	0.005*	7.42	3.00	1.61	
	6.2	1.80	4	0.146	15.73	3.35	0.80	
	7.4	17.64	7	0.000*	39.97	30.52	6.23	
	7.5	0.07	7	0.000*	65.67	32.82	2.50	
D	Sec. 1	1.98	2	0.186	27.47	10.14	1.14	

Note. IEP = Individualized Education Program; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; *p < .05.



CONCLUSION

Limitations:

- Reliability and validity of pre/post assessment
- Did not consider additional student and contextual factors
- Lacking comparative data for classrooms taught by one teacher
- Results may obscure variance at classroom and school levels

Implications:

- Placement criteria
- Administrative support
- Delivery and content of professional development
- Coaching and reflective practice

Future Research:

- Student achievement and co-teaching
 - Comparative data
 - Contextual and student variables
- Components of professional development